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DIRECT LOADING WITH AN IN-LINE SAMPLER

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When an in-line sampler is installed at a dairy farm facility, a separate structure to house the bulk milk tank trucks is not required. FDA describes the application and standard operating procedures (SOP's) for the installation and use of approved in-line samplers for the collection of dairy farm raw milk samples from direct load tankers as required in Section 6 of the Grade A Pasteurized Milk Ordinance.

In-line milk sampling is used when the dairy facility is set up to direct load bulk milk tankers bypassing the use of conventional bulk milk tanks for cooling and storage. The milk flows from the receiver through a chiller or plate cooler that cools the milk to

+/- 45^0F. In the case of the Anderson Instruments sampler, the milk then goes through a flow meter to the in-line sampler where a small amount of milk drips into a sample container positioned inside a refrigerator. No flow meter is used in the QMI and ISOLOK samplers. After the sampler, the milk flow continues to the bulk milk tanker. Some direct load farms also install bulk tanks for use as a back up or in emergency situations. It is important to meet with the producer, installer and field person during the planning and construction phases of the project.

An application to install and a written construction plan must be submitted to ISBOAH for review by the inspector.

The dairy producer must submit a signed ISBOAH in-line sampler protocol prior to use of the system.

General Construction Requirements for In-line Samplers:

1) The bulk milk tankers must be parked on an impervious surface that is sloped to drain and maintained clean in all weather conditions. If no metering device is installed, adequate coverage for the trailer must be provided. Coverage must be a permanent, solid structure and must provide protection from contamination.
2) The tanker load out connections must be made through tight fitting doors in the milkhouse wall that have padded bumpers on the outside ensuring the tanker fits tight against the milkhouse wall.
3) If an air blow is installed on the system, it must be installed to be accessible for daily manual cleaning and daily replacement of the single-service filters used on the air blow line.
4) A check valve must be installed downstream from the in-line sampler.
5) A check valve must be installed in close proximity to the connection point of each tanker.
6) A clean, well-lit, impervious work surface of adequate size must be provided in the milkhouse for the sub-sampling of milk samples.
7) Sweetwater, well water and/or Glycol systems are used to cool the milk going through the chiller. Propylene glycol, USP or food grade, is the approved type of glycol to be used. Industrial propylene glycol is not approved. The producer must have a letter from the manufacturer of the glycol, posted in the milkhouse, stating it is the approved type meeting the requirements of 21 CFR 184.1666. Sweetwater and glycol storage tanks must be of proper construction and have tight fitting, overlapping lids.
8) Below are some areas to pay particular attention to concerning water systems:
    a. Plate cooler water/fresh water add lines to plate cooler water storage tanks/fresh water feed lines downstream from storage tanks.
    b. CIP chemical addition/water connections to the wash vat.
    c. Calf milk pasteurizers/water connections for CIP and to cool the coils.
    d. Boiler systems - some are closed systems and some have fresh water add lines.
    e. Grey water recaptured for parlor wash down.

9) The interior lid and exterior dome lid of the bulk milk tanker must remain closed and sealed during the loading process. Proper vents on the tanker lid are to be installed to assure the needed airflow.

10) Milk transfer lines must be hard-piped to the tanker access doors using short jumper hoses to attach to the bulk milk tanker.

General Construction Recommendations for In-Line Samplers

Experience has shown the following items to be very helpful in making the direct load facility easier to maintain and meet the requirements of the dairy laws. We recommend the following:

1) Provide a heated surface and overhead protection for tanker parking to prevent build up of ice or snow.
2) Provide a channel drain at the rear of the tankers along the milkhouse wall. This will facilitate cleaning between the milkhouse and the tanker where the loading connections are made.
3) Install a CIP position switch on the milk pipeline system to prevent contamination of the milk with CIP solution.
4) Maintain an alternative sampler system in case problems develop with the primary sampler.
5) Keep replacement silicone diaphragms on hand (Anderson Instruments in-line sampler).
6) Construct the milkhouse and the trailer parking area on the same grade level to facilitate ease of making the tanker connections. If no metering device is installed, adequate coverage for the trailer must be provided. Coverage must be a permanent, solid structure and must provide protection from contamination.
7) Install the recording and indicating thermometers together in one thermometer well at an elbow for better milk contact and cleaning.

In-Line Sampler Device Requirement:

1) An approved in-line sampling device must be installed inside a refrigerator that can maintain 32-40^{0}F (0.0-4.4C) in an appropriate and easily accessible location in the milk line to ensure

accurate sampling and proper cleaning. The in-line sampler must be installed in the milkhouse.

2) The in-line sampler attachment must allow a single-service sample collection bottle to be attached directly on the sampler. The sample goes directly from the sampler into the attached sample collection bottle on the Anderson Instruments and the ISOLOK samplers. The QMI sampler collects the sample in a single-service transfer hose that is connected to a single-service sample collection bag.
3) The in-line sampler must be cleaned and sanitized via the pipeline CIP system and/or manually cleaned if needed.
4) Size of the milk sample needs to be determined with the cooperation of the installer and ISBOAH to ensure the sample collection container size is of an adequate volume to prevent overflow. In general, for the Anderson Instruments sample, bulk milk tankers with a capacity of <50,000 lbs. will require a 500 ml single-service sample collection bottle and tankers with a capacity of >50,000 lbs. will require a 1-liter sample bottle. The sample collection rate must be manually adjusted on the ISOLOK sampler. The QMI sampler rate is changed by changing the sample collection needle size. In all cases, the sample container must not exceed ¾ full.

Thermometer Requirements:

1) A **Recording Thermometer** (7-day chart) is required with the temperature probe to be installed in the milk line downstream from the cooling device prior to the in-line sampler device. This recording temperature probe should be installed in a thermometer well as close as practical to the required indicating thermometer, which is also in a thermometer well in the milk line. (See Indicating Thermometer below.)
    a. The owner or hauler/sampler shall document on the recording chart the date, farm permit number, regulatory agency tanker identification number and initials of the person who changed the chart.
    b. The owner or hauler/sampler shall document on the recording chart the identification number of each additional bulk milk tanker being loaded.

c. The owner or hauler/sampler shall make a weekly temperature check of the recording thermometer against the indicating thermometer at chart change. Document the temperature check on the recording chart and adjust the recording thermometer to match the indicating thermometer, if needed.

d. During an inspection by ISBOAH, the inspector will compare the temperature readings of the recording and indicating thermometers. The comparison will be documented on the recording chart and the inspection sheet.

e. Temperature recording charts are retained for 6 months and stored in a clean, dry place.

2) An **Indicating Thermometer (digital display or dial)** is required to be installed in the milk line in a thermometer well downstream from the cooling device prior to the in-line sampler device.

a. This thermometer shall be installed in a thermometer well as close as practical to the required recording thermometer.

b. Indicating thermometer must have a minimum scale of 2^0F (1^0C).

c. During an inspection by ISBOAH, the inspector will conduct an annual accuracy check at ice point of the indicating thermometer and document on the farm inspection sheet.

3) **Refrigerator Thermometers (digital or liquid filled in glass type stored in glycol)**

a. A thermometer is required in both the in-line sampler refrigerator and the sample storage refrigerator.

b. Refrigerator temperature must be recorded AM and PM from the thermometers and documented on the monthly temperature-recording log. If a recording thermometer is installed with each refrigerator, no log is necessary and the temperature checks are documented on the recording chart.

c. The refrigerator temperature logs and/or temperature recording charts shall be stored in a clean, dry area available for review and retained for six months.

d. During an inspection, the ISBOAH inspector will conduct an annual accuracy check at ice point of the refrigerator thermometers and will tag the thermometer. This accuracy check will be documented on the farm inspection sheet.

e. Test thermometers have a minimum scale of 2^0F (1^0C).

f. Check temperature just prior to collection of the sample to assure the temperature is in regulatory compliance between 32-40^{0}F (0.0-4.4^{0}C).

Refrigerator Requirements:

Two refrigerators are required, one for the in-line sampler and one for the storage of samples.

1) The refrigerator must be of an appropriate size to hold the sample container and the in-line sampler.
2) Refrigerator must be able to maintain the sample between 32-40^{0}F (0.0-4.4^{0}C).
3) Refrigerators are only used to collect and store samples. No food, beverage or any other items not related to the samples or sampling procedures are to be stored in the unit.
4) Refrigerator must be maintained in good working condition, repaired and clean inside and out at all times.
5) The sample storage refrigerator must be in the same room as the sub-sampling area.

Milk Sample Collection Requirements:

1) Person(s) performing the sample handling must possess a valid bulk milk hauler/sampler license with an in-line sampler endorsement.
2) Person(s) performing the sample handling must wash their hands before handling the equipment used to collect the milk sample.
3) Verify refrigerator temperature is between 32-40^{0}F (0.0-4.4^{0}C). Corrective action(s) must be taken if there is a temperature problem. Document corrective action(s) on the log or recording chart and retain records for 6 months.
4) Record the regulatory agency tanker identification number for each load on the recording chart.

5) At the end of milking, remove the sample container from the in-line sampler or the sampling tube from the sample port and immediately cap the container using the approved cap that had been stored in a sanitary manner. Record the milk temperature on the sample container. Place the sample in the approved refrigerator.
6) Prepare the in-line sampler for the CIP wash cycle or disassemble and manually clean and sanitize the sampler.
7) The exterior of the in-line sampler shall be hand-cleaned and sanitized before the start of the next milking. Sanitizer must be 200 ppm or equivalent with a test kit to check the solution. A spray bottle with sanitizer is required to sanitize the bottle attachment area on the in-line sampler.
8) At the start of the next milking, make sure the sample collection container is properly identified with the date, time, regulatory agency tanker identification number, permit number and initials of the person installing the container on the sampler. Position it properly to collect the milk sample.
9) Attach the milk line to the milk tanker. Sanitize the tanker valve and milk line fittings prior to attaching the line to the tanker.
10) Repeat steps 2-10 until the bulk milk tanker is full.
11) Documented milk weights must be provided on the farm. Some farms use scale weight and, in the case of the Anderson Instruments sampler, a printout strip is available to document the milk weight.

Sub-Sampling and Representative Sample and Sample Handling Requirements:

1) Person(s) performing the sample handling and sub-sampling must possess a valid bulk milk hauler/sampler license with an in-line sampler endorsement.
2) Person(s) performing the sample handling and sub-sampling must wash their hands before carrying out the following steps 3-6.

3) Remove the sample container from the refrigerator. Check and record the temperature of the sample storage refrigerator. Corrective actions must be taken if the temperature was out of the 32-40^{0}F (0.0-4.4^{0}C) range.

4) Observe the sample for off odors, visual defects, extraneous material and ice. Frozen samples cannot be used for official testing.

5) Agitate the sample container sufficiently to obtain a representative sample by rapidly inverting the sample container completely 25 times.

6) Transfer (sub-sample) a portion of the original sample into properly identified sample vials (3/4 full), including a temperature control (TC) sample, within 3 minutes of agitation.

7) Sub-sample vial shall be labeled with the following:

    a. Date of sampling

    b. Time of sampling (time of sample split)

    c. Producer Permit Number

    d. Regulatory agency tanker identification number

    e. Sample Temperature (Using the temperature of the refrigerator thermometer in the sample storage or sample collection refrigerator depending where the sample container was removed from.)

    f. Initials of the person performing the sub-sampling.

8) A temperature control (TC) sample is required for each bulk milk tanker and it shall be identified with the following:

    a. TC

    b. Date of sampling

    c. Time of sampling (time of sample split)

    d. Producer Permit Number

    e. Regulatory agency tanker identification number

f. Sample Temperature (Using the temperature of the refrigerator thermometer in the sample storage or sample collection refrigerator depending where the sample container was removed from.)

g. Hauler/sampler identification (initials, ID number or name)

9) Store the samples in the sample storage refrigerator until the bulk milk tanker is taken to the dairy plant. The samples must accompany the load to the dairy plant.

10) Sub-sampling provides the additional samples needed for the temperature control, the producer's milk company or the regulatory agency.

Approved In-Line Milk Sampler Contacts

Accurate Metering / Anderson Instruments
156 Auriesville Road
Fultonville, MY 12072
(800)833-0081/ext208
http://www.andinst.com

Isolok/Sentry Equipment
PO Box 127
Oconomowoc, WI 53066
sales@sentry-equip.com
http://www.sentry-equip.com

QMI/Quality Management, Inc.
426 Hayward Ave., North
Oakdale, MN 55128
Qmi2@aol.com
http://qmisystems.com

Laboratory Supply Companies

Nelson Jameson, Inc.
(800) 328-8302
http://www.nelsonjameson.com

Weber Scientific
(800) 328-8378
http://weberscientific.com